What is claimed is:

1. A DC motor comprising:

a stator having a plurality of poles arranged in a circumferential direction of the stator;

a rotor including a plurality of cores, a plurality of coils wound around respective cores, and a plurality of commutator segments electrically connected to respective coils; and

a plurality of brushes arranged and constructed to repeatedly start and interrupt a supply of current to the coils via respective commutator segments in order to rotate the rotor, wherein:

the poles have surfaces opposing to the rotor and the surfaces of two circumferentially adjoining poles have different polarities from each other, so that the polarities of the pole surfaces opposing to each coil alternate during each period of supply of the current to the coil;

each pole defines a reduced density area and an increased density area with respect to a magnetic flux density,

the reduced density area extends along an angular range from a first position, where the supply of current to the coils is initiated, to a second position, where the polarities of the pole surfaces opposing to each coil alternate;

the increased density area extends along an angular range from the second position to a third position where the supply of the current to the coils is interrupted; and

the magnetic flux density produced around each coil by a magnetic force of each pole when each coil is positioned within at least a part of the angular range of the increased density area is smaller than the magnetic flux density produced around each coil by a magnetic force of each pole when each coil is positioned within at least a part of the angular range of the reduced density area.

2. A DC motor as in claim 1, wherein at least a part of the increased density area is configured in shape to reduce the magnetic flux density.

3. A DC motor as in claim 1wherein at least a part of the reduced density area is configured in shaped to increase the magnetic flux density.

4. A DC motor as in claim 2, wherein:

each pole comprises at least:

a first permanent magnet extending substantially through the increased density area;

a second permanent magnet extending substantially through the reduced density area;

wherein a magnetic force of the first permanent magnet is smaller than a magnetic force of the second permanent magnet.

5. A DC motor as in claim 4, wherein the first and second permanent magnets are formed integrally with each other.

6. A DC motor as in claim 4, wherein the first and second magnets are made of different materials from each other.

7. A DC motor as in claim 4, wherein the first and second magnets are magnetized to different magnetizing strengths.

8. A DC motor as in claim 2, further comprising:

a first gap between the poles and the cores of the rotor corresponding to at least a part of the increased density area; and

a second gap between the poles and the cores of the rotor corresponding to at least a part of the reduced density area;

wherein, the first gap is larger than the second gap.

9. A DC motor comprising:

a stator having a plurality of poles comprising;

a surface directly opposing a rotor;

a polarity of an N-pole and a S-pole;

wherein the poles are uniformly arranged about a circumferential direction of the stator; and

wherein the surface directly opposing the rotor of one pole will have an N-pole and the adjacent pole surface directly opposing the rotor will have an S-pole, alternating the polarity as a rotor rotates; and

the rotor including a plurality of coils, wherein each coil comprises;

a core;

a wire with a first end and a second end;

a plurality of commutator segments;

a plurality of brushes arranged and constructed to repeatedly start and interrupt a supply of current to the coils via respective commutator segments; and

wherein within each period of supply of the current to the coil the coil rotates through two adjacent poles; and

wherein each pole includes a reduced density area and an increased density area with respect to a magnetic flux density; and

wherein the reduced density area is defined as extending along an angular range from;

a first position where the supply of current to the coils is initiated; to

a second position between two adjacent poles where the polarity of each adjacent pole on the surface directly opposing the rotor is alternated;

wherein the increased density area is defined as extending along an angular range from;

the second position; to

a third position where the supply of the current to the coils is interrupted; and

the magnetic flux density produced around each coil by a magnetic force of each pole when each coil is positioned within at least part of the angular range of the increased density

area is smaller than the magnetic flux density produced around each coil by a magnetic force of each pole when each coil is positioned within at least part of the angular range of the reduced density area.

10. A DC motor as in claim 9, wherein at least a part of the increased density area is configured in shape so as to reduce the magnetic flux density produced around the coil.

11. A DC motor as in claim 10, wherein at least a part of the reduced density area is configured in shape so as to increase the magnetic flux density produced around the coil.

12. A DC motor as in claim 11, further comprising;

a first gap between the poles and the cores of the rotor corresponding to at least part of the increased density area; and

a second gap between the poles and the cores of the rotor corresponding to at least part of the reduced density area;

wherein, the first gap is larger than the second gap.

13. A DC motor as in claim 9, wherein;

each pole comprises at least;

a first permanent magnet extending substantially through the increased density area, and

a second permanent magnet extending substantially through the reduced density area;

wherein a magnetic force of the first permanent magnet is smaller than a magnetic force of the second permanent magnet.

14. A DC motor as in claim 13, wherein the first and second magnets are made of different materials from each other.

15. A DC motor as in claim 13, wherein the first and second magnets are magnetized to different magnetizing strengths.

16. A DC motor as in claim 9 wherein;

each pole comprises at least;

a first permanent magnet extending through the increased density area and into the reduced density area, and

a second permanent magnet extending substantially through the remainder of the reduced density area;

wherein a magnetic force of the first permanent magnet is smaller than a magnetic force of the second permanent magnet.

17. A DC motor as in claim 16, wherein the first and second magnets are made of different materials from each other.

18. A DC motor as in claim 16, wherein the first and second magnets are magnetized to different magnetizing strengths.

19. A DC motor as in claim 9 wherein;

each pole comprises at least;

a first permanent magnet extending through a portion of the increased density area, and

a second permanent magnet extending through the remainder of the increased density area and substantially through the reduced density area;

wherein a magnetic force of the first permanent magnet is smaller than a magnetic force of the second permanent magnet.

20. A DC motor as in claim 19, wherein the first and second magnets are made of different materials from each other.

21. A DC motor as in claim 19, wherein the first and second magnets are magnetized to different magnetizing strengths.